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(12) United States Patent

Tsukamoto et al.

(54) WIRE ELECTRICAL DISCHARGE MACHINING APPARATUS, WIRE ELECTRICAL DISCHARGE MACHINING METHOD, AND WORK

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See application file for complete search history.

(56) References Cited

U.S. PATENT DOCUMENTS

4,473,733 A	* 9/1	984 Inoue		B23H 7/101
4.500.050 A	* 4/1	005 1		219/69.12
4,508,950 A	* 4/1	985 Inoue	•••••	219/69.14
				213/03.14

(Continued)

FOREIGN PATENT DOCUMENTS

CN 101670472 A 3/2010 JP H10-58237 A 3/1998 (Continued)

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(57) ABSTRACT

A mechanism in a wire electrical discharge machining apparatus for machining a workpiece by electrical discharge between a wire and the workpiece is disclosed. The mechanism includes a processing fluid bath configured to store processing fluid used for electrical discharge machining between the workpiece and the wire, a processing fluid supply port to communicate with the processing fluid bath and supply the processing fluid into the processing fluid bath from a processing fluid supply apparatus supplying the processing fluid, and a stream control mechanism to suppress a stream of the processing fluid supplied from the processing fluid supply port into the processing fluid bath in the direction of the water surface of the processing fluid in the processing fluid bath.

14 Claims, 10 Drawing Sheets

